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Switching in modulated quantum oscillators beyond the rotating wave approximation. VITTORIO PEANO¹, Albert-Ludwigs University Freiburg, MICHAEL MARTHALER, Karlsruhe University, MARK DYKMAN, Michigan State University — Experiments with Josephson bifurcation amplifiers have reached the regime where the switching between different metastable states is governed by quantum fluctuations [1]. The existing theoretical analysis of the metastable decay relies on the rotating wave approximation (RWA) and gives an exponentially small switching rate [2]. Therefore if corrections to the RWA modify the switching rate, they can become substantial even where they are small. We incorporate them within a semiclassical perturbation theory in the Floquet basis. Our analytical results are corroborated by numerical calculations and suggest a switching mechanism that had been previously overlooked.

[1] R. Vijay et al, Rev. Sci. Instr. 80, 111101 (2009).

[2] M. I. Dykman and V. N. Smelyanskii, Sov. Phys. JETP 67, 1769 (1988); M. Marthaler and M. I. Dykman, Phys. Rev. A 73, 42108 (2006).

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